Measuring the Employment Effects of the Rural Renewal Tax Scheme

Michael J. Keane and Eoghan Garvey

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Department of Economics
National University of Ireland, Galway

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Abstract

This paper presents evidence on the effectiveness of the Rural Renewal Tax Scheme introduced by the Irish Government in 1998. The rationale for the scheme puts the emphasis on new economic activity and economic growth in the designated area. Thus, it is legitimate to look for positive employment impacts as a primary outcome of the tax scheme. The empirical results suggest that the tax scheme has had positive effects on the numbers of people unemployed in the tax area. However, using rough estimates of the costs of the scheme, these employment gains are not significant enough for the scheme to pass an efficiency test.

Keywords: Evaluation, Tax Designated Area, Fixed Effects Regression, Efficiency Test

JEL Classification: D61, 378, R58.

1. Introduction

Despite the many social, political, environmental and economic considerations the key to development is capital placement. The question is how much capital to place, where and in what form (factories 'vs.' retail parks v. open space v. "human capital' v. housing etc.). The capital market is usually considered to be as close to a perfect market as one can find. The capital market "does what markets are supposed to do: buyers and sellers both think they are price takers, and there is a homogeneous good, capital or money. Differences of opinion about the soundness of various uses of that money generate bids, which allocate capital resources. Successful users of capital generate more opportunities, as losers are systematically weeded out. The market's criterion for 'good decisions' is clear – a return to the capital sufficient to replace it and leave a surplus. Saying it is close to perfect is saying that it is able to make good decisions most of the time. Capital goes where it makes a high private return" (Michaelson, 1981, 125-126).

Land markets do not necessarily always provide the conditions for capital to work smoothly and efficiently to ensure that opportunities are exploited and that each piece of land, for example, is used by the activity which could pay the highest current rent. In part, this may be because of the deliberate intervention of central and local governments through the imposition of planning controls, but it may also be for other fairly ordinary reasons (Evans, 1985). For example, the owners of land may be simply unwilling to sell for development at the price they are offered either because they think the market value might go higher, or their own "use value" exceeds the current market value. Also, sites may remain derelict and vacant in an urban area because rents and optimism are generally low, so redevelopment is not considered profitable there at a given point in time. The tracts of vacant land and derelict buildings that characterized Irish cities and towns in the 1960s and 1970s bore witness to some of these "market" realities. By the early 1980s it had become apparent at both national and local level that nothing was happening that might encourage development/redevelopment and that pro-active measures were required if the decline in the physical fabric of the main urban centers was to be addressed. It was obvious that private sector investment in the cities and towns was needed but that government

intervention was also required. Urban renewal schemes were first introduced in Ireland in 1985 to help stimulate private investment in inner-city areas. Since then tax incentives-based renewal schemes have become a popular policy tool.

A brief description of the key schemes introduced since 1985 is presented in Table 1, and Figure 1 shows the approximate geographical distribution of these schemes. The most prominent of these schemes have included urban renewal schemes (1985-1994), the seaside resort scheme (1995), revised urban renewal schemes (1998) which included the concept of Integrated Area Plans and the pilot rural renewal scheme (1998).

Urban renewal schemes were first introduced in an effort to alleviate the increasing problem of dereliction and dilapidation which had affected large parts of the inner areas of towns and cities nation-wide. In many cases these inner areas had sustained large population declines as growth and development began to decentralize and become increasingly concentrated in the suburbs. The objective of the urban renewal scheme was to promote urban renewal and redevelopment by promoting investment and refurbishment of buildings in designated areas. This property development focus has continued to be central throughout all of the subsequent schemes.

Significant resources have been expended on these schemes with very little evaluation of outcomes. Not surprisingly, the advocates of renewal schemes usually seek to link the tax incentives and the projects that follow from these incentives to meritorious goals like urban revitalization and local economic development. Thus, one supporter has recently described the rural tax scheme as "a marvelous stimulus for growth" (*Sunday Tribune*, 06.10.02). The limited evaluations published show that these type of schemes, in fact, give bad value to the public purse and to the community. The KPMG evaluation of urban renewal schemes 1984 – 1990 (Department of the Environment, 1996) estimated that the net cost to the Exchequer was somewhere between £367-£461 ml., and the net employment created for the country as a whole over the lifetime of the schemes was around 1,600 jobs. In those designated areas which had host communities, the evaluation showed that urban renewal did not address the issues that were central to the regeneration and sustainability of the community – public facilities, education, training, youth development and

employment for local people. Urban renewal schemes initiated subsequent to these findings have sought to redress some of the deficiencies with the introduction of the Integrated Area Urban Renewal Scheme introduced under the Urban Renewal Act 1998 (Department of the Environment, 1998; Revenue Commissioners, 2001). In the absence of good evidence and no evaluations of the different schemes, the Tax Strategy Group in the Department of Finance has expressed the view that, as a method of creating employment, the correlation between the amount invested in tax designated areas and the number of jobs created is not too evident (TS6 99/32).

2. The Rural Renewal Tax Scheme

Capital and its agents will naturally focus on regions that have already proved themselves through clear opportunities and solid rates of return. Usually the economies of urban areas are considerably thicker and more dynamic than are rural economies. Localised business opportunities may not appear sufficiently attractive in rural areas. The problem in rural areas can be made more difficult if there is only a limited number of potential entrepreneurs who, in turn, are constrained by capital availability, risk aversion and time horizons. Investor uncertainty, due to a lack of understanding of such markets, can lead to a self-reinforcing pattern of market neglect and continued ignorance. Such path dependence in local entrepreneurship can partially account for the widening gap between different regions' economic performance (Weiler, 2000). These are the circumstances where there can be an argument for using government intervention to encourage rural investment.

TABLE 1: Tax-Based Urban and Rural Renewal Schemes

Scheme	Brief Description of Eligible Areas
First Urban Renewal Scheme 1986-1994	Initially the five county boroughs Dublin Cork, Limerick, Galway and Waterford and The Custom House Docks Area. In 1998, 10 new areas were added and a further 9 in 1990. In 1991, the tax incentive scheme for the Temple Bar Area was created. Ballymum was designated in 1993.
Seaside Resort Scheme 1995	15 designated seaside resorts
Urban Renewal Scheme 1998	Under this revised scheme local authorities were requested to draw up Integrated Area Plans in r respect of each urban area they wished to have d designated. A total of 78 Plans were submitted For assessment by a broad based expert advisory Panel. The expert panel recommended designation in respect of 49 plans.
Pilot Rural Renewal Scheme 1998	Aimed at the upper Shannon region – counties Leitrim and Longford as well as certain areas in counties Cavan, Roscommon and Sligo.
Town Renewal Scheme 1999	Confined to towns 500-6,000 population

Source: Tax Strategy Group Paper 99/32.

The rural renewal scheme has followed on from the urban scheme. The tax incentives for the Irish rural renewal scheme were outlined in the 1998 Finance Act and the scheme was introduced from 1 June 1998. The scheme is a pilot initiative of rural renewal aimed at invigorating the Upper Shannon region and covers all of the counties of Leitrim and Longford as well as certain areas in counties Cavan, Roscommon and Sligo defined by District Electoral Divisions. The full description of qualifying rural areas can be found in Chapter 8 Select Committee on Finance and the Public Service (Dail Eireann, 1998). This description is reproduced here at Appendix 2. The rural renewal tax areas are outlined in Figure 1.

It is difficult to find an explanation for the choice of area designation (Dail Eireann, 2002). An official *ex post* rationale for selecting this particular areas can be found in Paper 99/32 of the Tax Strategy Group (TSG, 1999). "It has long been recognized that the area designated has suffered long-term population decline and less than average economic growth. It is also an area that is without significant urban centers that elsewhere have acted as focuses for economic growth and inward investment. In an effort to address these problems provisions were made in the 1998 Finance Act for the introduction of a tax incentive scheme along the lines of the urban renewal schemes for this area both to encourage people to reside in the area and to promote economic activity" (Department of Finance Tax Strategy Group Paper 99/32). A strong political debate about area designation might have been expected to accompany the announcement of the scheme, but, interestingly, the decision to select the particular areas provoked only a limited debate amongst the elected members of the Select Committee on Finance and the Public Service.

The most recent instance of "rural designation" is associated with the Clár programme, a programme for revitalizing rural areas (Department of AFRD, 2002). The objectives under Clár are (i) to try and reprioritise some investments under the National Development Plan to ensure that Clár areas get priority of investment under the Plan and (ii) to make available a €25.4 ml. fund over two years that allows matching funding to Government Departments and other state agencies for special projects that are needed for rural development and that are already earmarked for funding in the plans and programmes of different government departments and agencies. These Clár areas were selected on the basis of severe population loss over time (see Table 2). In all cases, the individual Clár areas are considerably smaller than the rural tax area and their experiences in terms of population losses are considerably more severe. Many of these rural areas could have also qualified for the tax designation in addition to, or instead of, the ones that were chosen. This comparison between Clár areas and the tax area helps to illustrate the arbitrary nature of the methods that have been used to define rural development areas in Ireland. These methods are quite a long distance from the kind of 'indicative targeting' of areas as suggested in Hodge et al. (1996).

TABLE 2:. Rural Population Decline 1926 – 1996. Clar Areas

Clár Area	Average Population Decline (%)	Population 1996	No. of DEDS
South West Cork & South Kerry	-47.11	23,814	50
South West Kerry	-53.55	19,885	49
Sliabh Luachra	-47.09	4,877	14
Sliabh Felim	-48.74	4,415	13
Sliabh Aughty	-53.94	4,869	26
West Clare	-45.79	20,327	57
West Galway/S-W Mayo	-46.86	16,803	44
N-W & Central Mayo	-51.49	25,999	50
West Sligo & N-E Mayo	-55.28	23,037	49
N Galway, E Mayo & N-W Roscommon	-51.63	23,037	44
S Sligo, N Roscommon S-W Longford & S Westmeath	-52.15	22,809	56
S Leitrim, N Longford S-W Cavan, N-W Meath & N Westmeath	-54.4	20,686	67
Leitrim, N-W Cavan, N-E Roscommon & E Sligo	-62.44	25,638	89
Donegal	-49.36	24,717	55
W Monaghan & S-E Cavan	-49.36	24,717	55
Cooley Peninsula	1.51	7,796	7

Source: Department of Agriculture Food and Rural Development. http://www.gov.ie/daff/Areasofl/Clar_Programme/Clar_infro.htm. Site contains a full description of the areas to be targeted under the Clár Programme.

The business tax incentives available under the rural tax scheme are tax relief for the expenditure incurred on the construction or refurbishment of industrial buildings or structures in use for the purpose of trade, and facilities such as piers and jetties. These buildings are entitled to 100 per cent accelerated capital allowances for both owner occupiers and lessors. These business tax incentives are introduced with effect from 1 July 1999. The qualifying period of the scheme was originally set to 31

December 2002. The scheme is cue to end in December 2004. The delay in the introduction of these reliefs was due to delays experienced in the approval process with the European Commission. The Commission, in approving the scheme, specified that investors active in the production, processing and marketing of agricultural products, the coal industry, fishing industry, motor vehicle industry, transport industry, steel production, ship-building, synthetic fibre industry and the financial services sector could not avail of the tax reliefs available under the scheme. The Commission also excluded property developers from claiming relief under the scheme. The rationale behind excluding property developers is that an award of capital allowances to a property developer was viewed by the EU Commission as operating aid, given that the construction or refurbishment of property is the main component of their day-to-day business activities.

The scheme also provides for tax relief for both owner occupier and lessors of residential property. This allows for owner occupier housing tax allowances of 100% for expenditure on refurbishment of residential premises, available at 10% per annum for 10 years; 50% allowance for new-build construction expenditure, available at 5% per annum over 10 years. There are also Section 23 reliefs for construction or refurbishment of, or the conversion into rented residential accommodation and 10 year property tax relief on a sliding scale.

3. Evaluation of the Scheme

An assessment of the rural renewal scheme first requires an understanding of the scheme's goals. The focus in this paper will be on economic development goals, specifically on employment effects. The rationale for the scheme does put the emphasis on new economic activity and economic growth. The argument of this paper is that it is legitimate to expect and to look for positive employment impacts in the designated areas as a primary outcome of the tax scheme. The Tax Strategy Group in the Department of Finance, as noted earlier, have been quite skeptical about any significant employment creation effects from tax schemes. They cite the weak employment results in the KPMG study of the original urban renewal schemes as an indication of what might be expected by way of employment effects. The Group also

makes the point that the majority of the beneficiaries of property tax relief schemes are likely to be high net worth individuals or corporate investors. Certainly, the economic principle of indifference should warn us about what to expect by way of societal benefits from policies designed around location land or sites. These policies by definition are unlikely to generate broad social benefits because the benefits end up in the pockets of the owners (who are probably not needy) of these fixed resources. These possibilities make it all the more interesting to look for evidence of any broad social gains, the most obvious being employment gains, associated with the rural renewal tax scheme.

The important question to be answered in any evaluation is, what would have happened to employment/unemployment in Leitrim and Cavan and the other eligible areas if the rural renewal scheme had not been introduced. The ideal experiment that would answer this question would be to take the designated area when the scheme is introduced, observe what happens throughout the life of the scheme and then go back in time to the same starting date and observe the same areas with no tax scheme. Obviously, it is impossible to do this kind of experiment but it encourages us to think about the kind of design that is needed for proper policy evaluation (Boarnet, 2001; Bartik and Bingham, 1997). This experimental method is perfectly feasible in clinical drug trials or in evaluating education and training programmes (Barnett, 1990; Boardman et al., 1998). In the drugs case one can randomly divide the subjects into two groups and then give one group the drug and the other a placebo. The hope is that the random nature of the assignment process will ensure that the experimental group (those given the drug) and the control group (those given the placebo) are the same for all important characteristics, so that any differences in the health of the two groups can be attributed to the drug. With most education and training programmes it is possible to also have proper experimental design. The challenge is how to replicate such experiments in the messy world of rural tax relief policies, so that one can be sure that any measured differences in employment/unemployment levels can be accurately attributed to the programme or scheme being evaluated (Boardman et al., 1998). To address this challenge it is possible to borrow from a rich and growing literature on the evaluation of enterprise zones in the USA (Boarnet, 2001; Courant, 1994; Papke, 1994).

Boarnet (2001) review this literature and makes three important points about a good enterprise zone evaluation. First, the evaluation must be able to provide convincing evidence that the effects attributed to the area are in fact due to the tax policies and not to other factors. Economic fluctuations, local economic conditions, unique local characteristics and, indeed, the manner in which areas are selected can all produce economic impacts that might be confounded with the policy outcomes that the evaluator is trying to measure. Second, to the extent that it is possible to approximate the methods used in clinical drug trials, tax designated area evaluations will be more convincing. Finally, a crucial aspect of control group research is the existence of the control group itself. How would we know if a drug worked if we did not compare test subjects to persons who did not take the drug? We must have an evaluation method that can systematically compare the tax designated area with areas that did not get the benefits of tax designation. The elements that are needed for a robust evaluation can be provided by using fixed effect regression methods and year dummy variables (see Section 6). There are good examples of using these methods to be found in some of the literature that was cited earlier.

4. Measuring Employment Gains Locally

Local employment gains can be measured with the Live Register. The Live Register is compiled from returns made directly to the CSO by each local employment office of the Department of Social, Community and Family Affairs (DSCFA). The geographical spread of local offices ensures that there is a good degree of local detail in the data. It comprises persons under 65 years of age in the following classes:

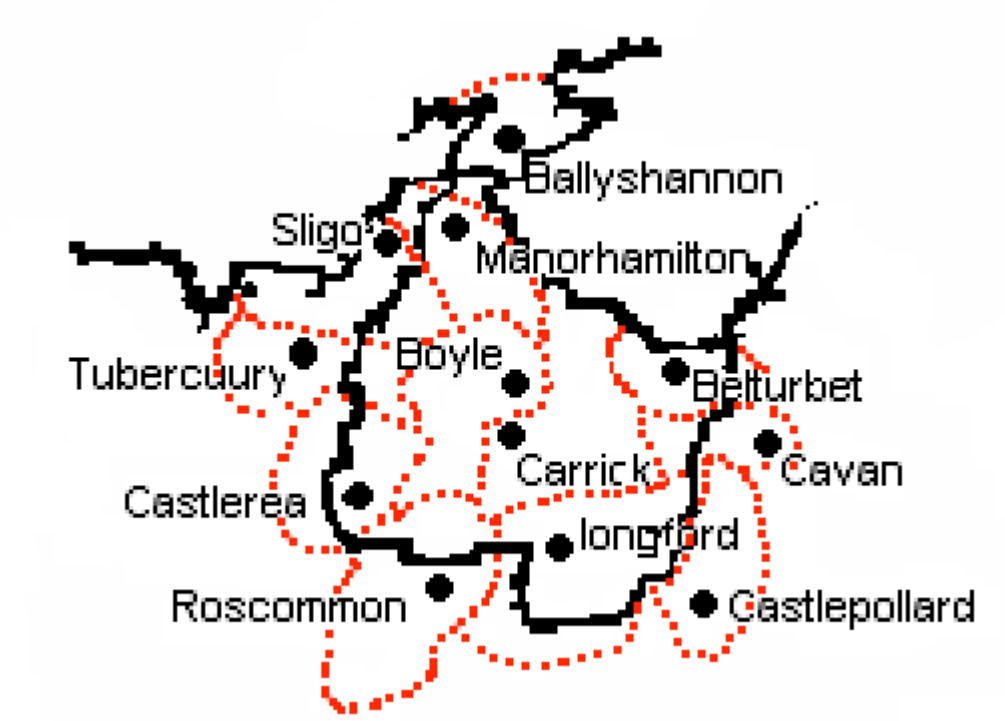
- All claimants for Unemployment Benefit (UB) excluding systematic short-time workers.
- Applicants for Unemployment Assistance (UA) excluding smallholders and self-employed persons.
- Other registrants including applicants for credited Social Welfare contributions but excluding those directly involved in an industrial dispute.

Strictly speaking, the Live Register is not designed to measure unemployment. This is done through the Quarterly National Household Survey which defines the unemployed as persons who, in the week before the survey, were without work and available for work and had taken specific steps, in the preceding four weeks, to find work. The Live Register goes far beyond this formal definition of unemployed, it includes part-time workers (those who work up to three days per week), and seasonal and casual workers entitled to Unemployment Assistance or Benefit. Nonetheless, despite all the user warning statements, movements in the Live Register numbers "do over time indicate fairly well what is happening to real unemployment" (McDowell, 2002). A more recent discussion on the measurement of unemployment and the role of the Live Register can be found in Walsh (2003).

There are some problems with using the Live Register data. The basis of the area classification used for the data is the DSCFA local office of registration. The area served by Local Employment Offices does not correspond to specific geographic boundaries and it is difficult to find any clear explanation of how adjacent areas are assigned to the individual local offices. Figure 2 shows the set of local employment offices located in, and adjacent to, the tax designated area. For discussion purposes, each local employment office is given indicative boundaries in Figure 2 to show the likely catchment area of each office. In geographical terms, the tax area is underbounded as it crosses over a number of local employment office areas with resultant "spillover" problems when it comes to monitoring changes in employment/unemployment. Due to these spillover problems, we cannot be certain in all cases how well any improvements in employment/decreases in unemployment in tax zone areas will be reflected in the Live Register data. Based on the configurations shown in Figure 2, we can hypothesise that the impacts of employment gains/unemployment reductions will be most strongly reflected in the Live Register data for Boyle and Carrick-on Shannon, less do for the local employment areas of Manorhamilton, Castlerea, Longford and Belturbet and least of all for the office areas adjacent to the Tax Zone; Ballyshannon, Sligo, Tubbercurry, Castlepollard, Roscommon and Cavan. The Boyle and Carrick-on-Shannon local employment areas are completely inside the tax area and so the full impacts of unemployment reductions/employment gains should be registered. For the second set of local employment offices some of their area is inside and some outside the tax area. Thus,

any positive employment effects felt in the inside might be weakened somewhat in the aggregate data by negative effects felt outside. This possibility is even stronger in the case of the third set of local employment areas. These potential differences in the data are fully investigated in the statistical analysis that follows:

Figure 2: Tax Area, Local employment Offices and Indicative Boundaries



Tax Area

Local Employment Office areas

5. Statistical Methodology

The data for the econometric estimations that follow come from all forty-eight Local Employment Offices within the Border-Midlands-West (BMW) region in Ireland. There are sixty-eight consecutively monthly observations of the Live Register from each Local Employment Office used in the analysis, beginning in February 1997, giving a total of 3,264 observations. It is possible, therefore, to create a "control group" of Employment Offices, where the numbers on the Live Register are likely to be unaffected by the scheme, and another "test group" of Employment Offices, where the scheme may have an effect on the Live Register . In fact, as we shall see below,

we set up four such pairs of "test" and "control" groups in an effort to find robust measures of the scheme's effects on the Live Register.

One practical problem with using a "control group" methodology is that, whether affected by a particular programme or not, it is not likely that any two randomly selected real world locations are identical in their other main characteristics. It is, also, almost certain that we will not have full information on the precise individual characteristics which differentiate real world locations. Consequently, there is likely to be a large amount of unexplained heterogeneity amongst the forty-eight locations of our particular data set. Given that the panel nature of our data allows us to control for the individual effects of each location, it would seem advisable to attempt to control for such heterogeneity. A further reason for so doing so is that, as we have seen, the locations within the boundaries of the tax designated area cannot be regarded as having been randomly selected from the "population" of 48 BMW locations and, thus, all possible inherent differences ("individual effects" or "heterogeneity") ought to be controlled for.

The most common ways of controlling for individual level heterogeneity are to use either random or fixed effects estimators. We follow Papke (1994) and Boarnet and Bogart (1996) and use a fixed effects estimator. The fact that we have very regular information over the lifetime of the scheme from all Employment Offices within the BMW, not just a sample, suggests a fixed effects approach. Also, as we shall see below, we wish to control both for trend differences between regions as well as average differences, and a fixed effects approach can be consistently applied to both of these individual effects. Finally, following Boarnet and Bogart, we also control for seasonal effects and global (BMW region-wide) effects, as these may create statistical "noise" which could mask the possible effects of the scheme.

More formally, each location, whether inside or outside the tax designated area, is defined as the catchment area of a Local Employment Office. The indicator we use to test for the effects of the program is the number of people signing on the live register each month at each Local Employment Office. The equation for estimation is:

$$UNEMP_{i,t} = \beta_i + \sum_{t=1}^{T} \delta_t EZ_{i,t} + \sum_{t=1}^{T} \alpha_{1-t} Month_t + \phi_i Trend_{ti} + e_{i,t} \quad (1)$$

$UNEMP_{i,t}$ is the unemployment level at each Local Employment Office in each sample month (measured as the log of the number of people who register as unemployed in a particular office each month). $EZ_{i,t}$ is a dummy equal to 1 if the Local Employment Office is in the tax designated area in month t, and zero otherwise, so δ_t is the primary parameter of interest for the study. Because there is a separate coefficient estimated for each month, we should be able to tract the effects of the scheme month to month. This should enable us to get a picture of when the scheme begins to affect unemployment, if it does so, and when these effects begin to taper off, if they do so. The first month for which the dummy is created is month 24 of our data set – January 1999. Regarding the other variables in Equation (1), $Month_t$ is a dummy variable equal to 1 if the observation is from month t, and zero otherwise. It is designed to control for effects common to both the test group of locations and the control group, and thus controls both for seasonal and global trends. $Trend_{i,t}$, on the other hand, is a linear time trend constructed separately for each Local Employment Office catchment area, and is an attempt to control for local trends in unemployment. The subscript i always indexes Local Employment Office catchment areas, while t indexes months.

Equation (1) could also be estimated in differenced form to allow for the possibility of autocorrelation in levels (or to control for stochastic, as opposed to deterministic, local trends). However, estimation of the differenced model means losing a large amount of "long term" information. Therefore, in what follows, we only report the levels' results and not the results for the differenced equations (which, in general, clearly support those of the levels' models). We do, however, estimate the levels' model of Equation (1) four times to allow both for heteroskedasticity and for first order autoregressive autocorrelation. The four estimations are as follows: i) an OLS equation estimating Equation (1), ii) an FGLS (feasible generalized least squares) estimation of Equation (1) allowing for group-level heteroskedasticity, iii) a second FGLS estimation allowing for both group-level heteroskedasticity and an AR1 autocorrelation process that is uniform across all catchment areas and iv) a final FGLS equation allowing for both group-level heteroskedasticity and an AR1

autocorrelation process that is allowed to vary from Local Employment Office catchment area to catchment area.[1] For these estimations, the results of which are reported in Table 3 in the next section, the $EZ_{i,t}$ variable is coded 1 from month 24 of our data set onwards for all of the six Local Employment Offices within the tax designated area – Boyle, Carrick-on-Shannon, Manorhamilton, Longford, Castlerea, and Belturbet. The "control group" is the remaining 42 Employment Offices (as well, of course, as all Employment Offices before month 24).

There are, though, as we have seen, a further six Local Employment Offices skirting the borders of the tax designated area. These are: Sligo, Tubbercurry, Ballyshannon, Roscommon, Castlepollard and Cavan Town. Given that it is possible that numbers registering at these six Local Employment Offices may be directly affected by the policy within the tax designated area, the above versions i) to iv) of Equation (1) are all re-estimated. In the four new estimations, $EZ_{i,t}$ is set equal to 1 (from month 24 of our data) at all 12 Local Employment Offices that could possibly be affected by the exemptions within the tax designated area (the six inside the designated area and the six just on its borders). The new 'control group' is the remaining 36 Employment offices.

In an attempt to increase the power of the tests, a third set of four estimations is carried out, where the six Employment Offices just outside the border of the zone are completely excluded from the sample. In these estimations, $EZ_{i,t}$ is equal to 1 for the six Local Employment Offices within the tax designated area (from month 24 of our data), while the control group consists of the 36 Local Employment Offices left in the sample after dropping the 6 'border' Employment Offices (i.e. it is the same control group as in the second set of estimations).

In a final attempt to sharpen results, another series of regressions are run. For the 'test' group of Employment Offices in these regressions only two Local Employment Offices are defined as being fully within the tax designated area (as we have seen, these are Carrick-on-Shannon and Boyle). There are 10 areas excluded from the

[1] We also experimented with AR process up to AR12, but the results were substantially the same as in our reported preferred specification.

estimations (the other 4 Local Employment Offices within the zone borders and the six exchanges just outside its borders), again leaving a control group of 36.

Figure 3 – 5 in Appendix 2 show the mean unemployment rates for the test and control areas for the first three of the above specifications. In all cases there is a clear downward trend (apart from seasonal variation) for most of the period. This becomes an upward trend in the last eight or nine months of the study in the designated area, and somewhat earlier in the rest of the BMW region. That is to say, in all three Figures the downward trend in the tax designated areas appears to last a number of months longer than in the control areas. Furthermore, the upward trend at the end is slightly steeper for the control offices than for the test offices. Together, both of these features of the raw data suggest that once we control for a common trend between the two groups (which we do with the Month variable) we may expect some positive effect (i.e. a reduction in unemployment) in the test area towards the end of the period.

Also, from Figures 3 – 5 we can see that average unemployment in the six border areas is higher than in the six areas within the region (since the average unemployment is higher in the 12 test areas of Figure 5 than in the 6 test areas of Figure 3). The tax designated area as a whole, in fact, appears to have low absolute levels of unemployment compared to the rest of the whole BMW region. We do not have information on unemployment rates for each catchment area, but it is likely that they are at least as high within the borders of the region as outside them, and the low absolute levels are simply due to a small labour force.

6. Results

Each of the 16 estimations yield a large number of estimated coefficients, so results are only given for the signs of significant values of $\hat{\delta}_t$ [2], the scheme dummy coefficient. A negative sign on $\hat{\delta}_t$ signifies a reduction in unemployment that may be

[2] Full results of each equation are available on request. In general the control variables (Month, Trend and Local Employment Office identifiers) turn out to be strongly significant.

attributable to the enterprise scheme. Positive significant signs are very rare (and only once significant) and so are not a problem for interpretation.

The log likelihood value of each estimation is reported to enable evaluation of the effect of a particular restriction (e.g. the restrictions involved in going from FGLS(3) to FGLS(2) in Tables 3-6 below) on the log likelihood value. In general, the larger the reduction in log likelihood, controlling for the number of restrictions, the less plausible are the particular restrictions involved. In all cases, for instance, the OLS estimations are quite implausible in relation to FGLS(1) in the tables below. The large fall in log likelihood in moving from FGLS(1) to OLS in Tables 3-5 is reflected in the fact that LR tests of groupwise heteroskedasticity reject the null of homoskedastic errors in every estimation. In all the results below, no restriction is accepted.

The results of the first set of four estimations, where the control group is the 42 Local Employment Offices outside the tax designated area, are given below in Table 3. All coefficients have the expected signs in all four estimations. Given the log likelihoods, FGLS(3) estimation is the preferred estimation. A straightforward OLS estimation would overestimate the number of months for which unemployment was significantly lower than in the rest of the BMW region. The results of FGLS(3) suggest that if there is an employment effect of the enterprise scheme it only becomes significant sometime around 2 years after the scheme has started. When one compares the average coefficient size in the OLS and FGLS(3) estimations, one finds that the significant OLS coefficients cluser around –.192, while the significant FGLS(3) coefficients cluster around –.127, getting absolutely small in the last few months.

TABLE 3: Results with 6 Test Employment Offices and 42 Control Offices

Estimation Type	Log Likeli-hood	Significant at 5%	Significant at 10% (and not at 5%)	Average of Significant Coefficients	Change in Live Register (in Person Months)
		Months after starting date in which $\hat{\delta}_t$ is significant.	Months after starting date in which $\hat{\delta}_t$ is significant.	Average size of coefficient when significant at 10% or less	Total changes in the six 'test' Employment Offices attributable to scheme (fitted using all $\hat{\delta}_t$ sig. at 10%)
OLS (ML)	3,697	15, 23-45	13,14, 17, 22	-.192	-18,708
FGLS(1), Group Hetero.	4,769	22-45	15, 21	-.136	-14,628
FGLS (2), Group Hetero+Common AR1 Autocorrelation	6,294	29,31-45	28,30	-.145	-10,776
FGLS (3), Group Hetero + Varying AR1 Autocorrelation	6,459	28-42, 45	24, 27, 43,44	-.127	-10,494

Based on the latter figure, it would appear that from about month 27 onwards unemployment is on average around 12% less in the scheme zone than in the rest of the BMW region, controlling for the other sources of variation than we have controlled for. This is equivalent to about 600 people per month or, as we can see from the table, almost 10,500 person months in total up to the end of our data period.

In Table 4 below, we include the results from the set of estimations where the six border Local Employment Offices are included in the tax designated area. Thus, for calculating the estimations reported in Table 4, there are twelve exchanges counted as being in the tax designated area, and a control group of thirty-six exchanges outside it. At first sight, Table 4 gives results that are quite different to those in Table 3. The results from the first estimation suggest little difference in unemployment between the 12 scheme areas and the 36 control areas, apart from the peculiar result for month 33 after the scheme was inaugurated. However, when we control for groupwise heteroskedasticity and Employment Office specific autocorrelation, Tables 3 and 4 begin to seem much more alike. The log likelihood figures suggest that once again FGLS(3) is the preferred specification, so again it appears that the employment effects of the scheme are somewhat delayed – till roughly month 28 or 29 after the scheme's

in auguration. As with the results of Table 3 there are hints of a decline in the strength of these effects after month 40 or so – perhaps due to more general equilibrium effects (e.g. people relocating to the scheme area, etc.). Also the significant coefficients of the ~GFLS(3) equation cluster around -.1, suggesting an overall weaker effect that that obtained in Table 3. From the coefficients of these estimations, the total predicted reduction in the Live Register in the six Employment Offices within the tax designated area (6,810 person months) is also noticeably less than in Table 1. None of this is surprising, given the definition of the scheme area for the analysis reported in Table 4.

TABLE 4: Results with 12 Test Employment Offices and 36 Control Offices

Estimation Type	**Log Likeli-hood**	**Significant at 5%**	**Significant at 10% (and not at 5%)**	**Average of Significant Coefficients**	**Change in Live Register (in Person Months)**
		Months after starting date in which $\hat{\delta}_t$ is significant.	Months after starting date in which $\hat{\delta}_t$ is significant.	Average size of coefficient when significant at 10% or less	Total changes in the six 'test' Employment Offices attributable to scheme (fitted using all $\hat{\delta}_t$ sig. at 10%).
OLS (ML)	3,706	33(+)	34	.014	+156
FGLS(1), Group Hetero.	4,762	28-45	27	-.115	-9,132
FGLS (2), Group Hetero+Common AR1 Autocorrelation	6,228	33, 34	32, 35-39	-.108	-3,564
FGLS (3), Group Hetero + Varying AR1 Autocorrelation	6,397	29-42	28, 43	-.102	-6,810

For Table 5, we hope to increase the power of the tests by completely removing the six border exchanges from the sample. Thus the control group is reduced from 42 in Table 3 to 36 in Table 5, with the 6 Local Employment Offices in the zone as the test areas. The effect of imposing this 'cordon sanitaire' around the tax designated area should be to increase the coefficient sizes and t statistics (compared to Table 3) if the Live Register in these 'border' Employment Offices are being positively affected by the scheme. This is because imposing a 'cordon sanitaire' around the tax designated area should increase the contrast between those Local Employment Offices within the

zone and the control group without. If, on the other hand, the coefficient sizes and significances turn out to be close to those in Table 3, the suggestion is that the positive employment effects noted in Table 3 are primarily confined to the six Employment Office catchment areas within the borders of the tax designated area.

TABLE 5: Results with 6 Test Employment Offices and 36 Control Offices

Estimation Type	**Log Likeli-hood**	**Significant at 5%**	**Significant at 10% (and not at 5%)**	**Average of Significant Coefficients**	**Change in Live Register (in Person Months)**
		Months after starting date in which $\hat{\delta}_t$ is significant.	Months after starting date in which $\hat{\delta}_t$ is significant.	Average size of coefficient when significant at 10% or less	Total changes in the six 'test' Employment Offices attributable to scheme (fitted using all $\hat{\delta}_t$ significant at 10%).
OLS (ML)	3,582	15, 27-45	17, 23-26	-.156	-16,008
FGLS(1), Group Hetero.	4,262	22-45	15	-.143	-14,682
FGLS (2), Group Hetero+Common AR1 Autocorrelation	5,712	31-42, 45	29,30, 43, 44	-.15	-10,548
FGLS (3), Group Hetero + Varying AR1 Autocorrelation	5,824	28-42, 45	43, 44	-.136	-10,134

The results of Table 5 are, in fact, very close to those of Table 3. The exclusion of the six 'border' areas makes little difference to the results, except that there is a very slight increase in the absolute value of significant coefficients. Compared to Table 3 the average rises from about .127 to .136 in the FGLS(3) specification, which is once again the favoured one. This change is equivalent to a change from about 12.2% to 12.8% in the estimated reduction in monthly unemployment due to the scheme. The sum of the monthly predicted 'person-month' effects is also very close to that in Table 3.

In Table 6, the results from the final specification are reported. Boyle and Carrick-on-Shannon are the only two included test areas, while the control areas are the same 36 as in the estimations of Tables 4 and 5. The logic of having such a small test

group is that these are the only two areas where the whole catchment area of the Local Employment Offices is within the borders of the zone. There is a risk of losing power due to the reduction in the size of the test group, but there should also be some gain from the exclusion of the 10 regions where we expect weaker effects from the scheme. In these regressions, in particular, it is worth paying attention to the size of the coefficients. If the scheme is successful in generating employment, we would expect larger negative coefficients in Table 6, in comparison with the other estimations.

The results in Table 6 below for the preferred specification (again FGLS(3)) are slightly weaker in terms of significant coefficients than those in Tables 3 – 5. However, the average coefficient size has risen sharply. It is now approximately double that in all the other regressions. This is further evidence that the scheme is having an effect, at least as measured within the modelling framework we have chosen. The effect may turn out to be temporary (in all the equations there is a very slight tapering off of coefficient size from about month 40 of the scheme onwards – this can be seen very clearly in most of the Charts 1 – 7 in Appendix 3, but it does seem that, as its strongest, the employment effects of the scheme do seem to register statistically, even in the extremely conservative specifications of Table 6.

Based on these results it appears likely that the enterprise scheme has had positive effects on the number of people unemployment in the tax designated area. The average size of this effect would appear to be a reduction of almost 13% in those registered as unemployed in the tax designated area. This reduction tends to become statistically significant around two years after the introduction of the scheme. In person months, it appears from Table 3 and Table 5 that the total reduction in numbers on the Live Register in the six Employment Offices within the tax designated zone (within the period of our study) is slightly over 10,000 person months.

TABLE 6: Two Test Employment Offices only (Boyle and Carrick-on-Shannon) and 36 Control Offices

Estimation Type	Log Likeli-hood	Significant at 5%	Significant at 10% (and not at 5%)	Average of Significant Coefficients	Change in Live Register (in Person Months)
		Months after starting date in which $\hat{\delta}_t$ is significant.	Months after starting date in which $\hat{\delta}_t$ is significant.	Average size of coefficient when significant at 10% or less	Total changes in the six 'test' Employment Offices attributable to scheme (fitted using all $\hat{\delta}_t$ sig. at 10%).
OLS (ML)	3,162	13, 14, 15, 17, 30-45	16, 28, 29	-.231	-21,342
FGLS(1), Group Hetero.	3,758	15, 17, 30-45	14, 29	-.249	-19,722
FGLS (2), Group Hetero+Common AR1 Autocorrelation	5,162	15, 30-45	3, 14, 17, 29	-.246	-20,460
FGLS (3), Group Hetero + Varying AR1 Autocorrelation	5,255	32-34	35-38	-.285	-8,532

However, as we see in Charts 1-7 in the Appendix, there is evidence of a slight tapering off of the effect towards the end of the time period of our study. In a number of cases there are coefficients insignificant at 5% (or even at 10%, in Table 6) in the last few months of the study: also, coefficients become slightly smaller. We cannot, of course, be sure that this tapering off will have continued past the terminal month of our study. Also, the reasons for its existence are uncertain. It may be due either to general equilibrium effects (unemployed people moving into the area) or due to the possibility that the scheme may be more (or perhaps less) effective when the broader trend is for falling unemployment rather than when, as in the last months of our study, the broader trend is for rising unemployment. Further data and further investigation of the time series properties of the data are certainly needed to reach acceptable conclusions on these issues. What does not seem to be in doubt, if our methodology is accepted, is that there have been clear and sizeable positive employment effects, whether temporary or not, and that these positive effects can most convincingly be ascribed to the introduction of the rural renewal scheme.

7. Discussion and Conclusions

Tax schemes in Ireland have not been subjected to rigorous evaluation. Given our current and likely future budgetary conditions, it is important to look at these relief schemes and to make clear the cost and benefit implications of policy decisions in relation to such reliefs. The popular viewpoint is that thee schemes help steer investment towards those areas that the Government wishes to prioritise for development. The econometric evidence does show that there have been clear and significant employment effects associated with the rural tax scheme. However, the interesting question from a policy point of view is whether the positive employment gains are significant enough for the scheme to pass an efficiency test. To address this question fully we also need to know the costs of the scheme.

The Office of the Revenue Commissioners is the main source of information, statistics and any data on the cost of tax incentives/expenditures (TSG, 2002). The costs of any tax relief scheme is estimated in terms of taxes foregone to the Exchequer. There is, of course, the argument that the availability of tax incentives encourages economic activity that otherwise would not have occurred. Thus, while on the one hand, a scheme means lost tax revenue, it could also lead to tax revenue gain from new investment activity, employment, VAT receipts, etc., and this could serve to partially or wholly offset the direct tax revenue foregone. Equally it can be argued that some tax incentives are simply deadweight in that they pay individuals for what they do or would do anyway. These arguments take on a particularly strong flavour when they are made from the perspective of local projects and their local impacts. Boardman (2001) outlines several reasons for exercising caution in counting revenues from local projects that are generated by secondary market effects and local multiplier effects as benefits of schemes.

The convention is to measure the costs of tax reliefs as taxation that is foregone. Unfortunately, there are only limited estimates available on the costs of schemes from the Revenue Commissioners. Materials published by the Tax Strategy Group last year (02/28, 2002) showing the costs of the major tax incentives have no data for

urban or rural renewal schemes. More recent data have been reported from a Department of Finance memo (*Sunday Tribune*, 11.05.03). This memo discusses the political pressure to extend the area and timescale of the rural renewal scheme and warns that "even confined to current areas, an extension is expected to cost the state an additional €30 million a year." This estimate is bound to be tentative, given the difficulties acknowledged by the Revenue Commissioners in arriving at any cost figures for any of the tax relief schemes (TSG, 2002). The employment benefits have been econometrically estimated at approximately 600 jobs per month. If we assume that these employment gains are realized over the period 2001-2004, then we can estimate the annual employment benefit as 600 multiplied by the annual average unskilled wage in construction. This yields a figure of €16.2 ml. annually. However, the market wage must be replaced with a shadow wage that reflects the opportunity cost of labour. In the CBA system used to evaluate industrial projects (Honohan, 1998) the economic gain from reducing unemployment is captured by setting the shadow wage equal to 80% of the market wage, that is treating 20 per cent of a project's wage bill as a net economic gain. In a fully employed economy, the market wage reflects the opportunity cost of labour and is the same as the shadow wage. Barry et al. (2000) have recently argued that a higher shadow wage is now more appropriate than the 20 per cent rule. They make the case that the shadow wage should be set equal to the market wage and that this should be the new benchmark for the Dublin region and other locations that are deemed to be at full employment. However, they concede that the evidence on regional imbalances in labour market conditions warrants a regional differentiation of the shadow wage. Their reference shadow wages are: Dublin = 1, rest of Ireland = 0.05 and BMW = .90. This implies that the benefits attributable to a project should vary from 0% of its wage bill in Dublin to 10% in the BMW region. This would give a lower bound of the annual benefits estimate for the rural renewal of €1.62 ml. which can be matched against an estimate of its cost. Regardless of what assumptions one makes about shadow wages, or the tentative nature of the Revenue Commissioners' costs, it is quite clear that the rural incentives scheme is a very poor policy tool from a national economic point of view.

APPENDIX 1

DESCRIPTION OF QUALIFYING RURAL AREAS

Description of qualifying rural areas of ***Cavan***

The District Electoral Divisions of Arvagh, Springfield, Killashandra, Milltown, Carrafin, Grilly, Kilconny, Belturbet Urban, Ardue, Carn, Bilberry, Diamond, Doogary, Lissanover, Ballymagauran, Ballyconnell, Bawnboy, Templeport, Benbrack, Pedara Vohers, Tircahan, Swanlinbar, Kinawley, Derrynananta, Dunmakeever, Dowra, Derrylahan, Tuam, Killinagh, Eskey, Teebane, Scrabby, Loughdawan, Bruce Hall, Drumcarban, Corr, Crossdoney and Killykeen.

Description of qualifying rural areas of ***Leitrim***

The administrative county of **Leitrim.**

Description of qualifying rural areas of ***Longford***

The administrative county of **Longford**.

Description of qualifying rural areas of ***Roscommon***

The District Electoral Divisions of Ballintober, Castleteheen, Carrowduff, Kilbride North, Lissonuffy, Killavackan, Termonbarry, Roosky, Kilglass North, Kilglass South, Bumlin, Cloonfinlough, Killukin (in Roscommon Rural District), Strokestown, Annaghmore, Tulsk, Coolougher, Ballinlough, Kiltullagh, Cloonfower, Artagh South, Artagh North, Ballaghaderreen, Edmondstown, Loughglinn, Buckill, Fairymount,

Castlereagh, Frenchpark, Bellangare, Castleplunket, Baslick, Breedoge, Altagowlan, Lough Allen, Ballyfarnan, Keadue, Aghafin, Ballyformoyle, Crossna, Kilbryan, Boyle Rural, Boyle Urban, Tivannagh, Rushfield, Tumna North, Tumna South, Killukin (in Boyle No. 1 Rural District), Oakport, Rockingham, Danesfort, Cloonteem, Kilmore, Elia, Ballygarden, Aughrim East, Aughrim West, Creeve (in Boyle No. 1 Rural District), Creeve (in Roscommon Rural District), Elphin, Rossmore, Cloonyquinn, Ogulla, Mantua, Lisgarve, Kilmacumsy, Kilcolagh, Estersnow, Croghan, Killummod, Cregga, Cloonygormican, Kilbride South, Kilgefin, Cloontuskert, Drumdaff and Kilteevan.

Description of qualifying rural areas of ***Sligo***

The District Electoral Divisions of Ballintogher East, Ballynakill, Lisconny, Drumfin, Ballymote, Cloonoghill, Leitrim, Tobercurry, Kilturra, Cuilmore, Kilfree, Coolavin, Killaraght, Templevanny, Aghanagh, Kilmactranny, Ballynashee, Shancough, Drumcolumb, Riverstown, Lakeview, Bricklieve, Drumrat, Toomour, Kilshalvy, Killadoon, Streamstown, Cartron, Coolaney, Owenmore, Temple, Annagh, Carrickbannagher, Collooney, and Ballintogher West.'.".

APPENDIX 2

MEAN UNEMPLOYMENT RATES

Figure 3: Comparing Unemployment inside and outside the Designated Area (Data from the Estimations reported in Table 3)

Unemployment inside and outside the Enterprise Zone

Mean Unemployment Levels at the Six Labour Exchanges within the Scheme Boundary Compared with Mean Unemployment Levels in the other 42 Regions

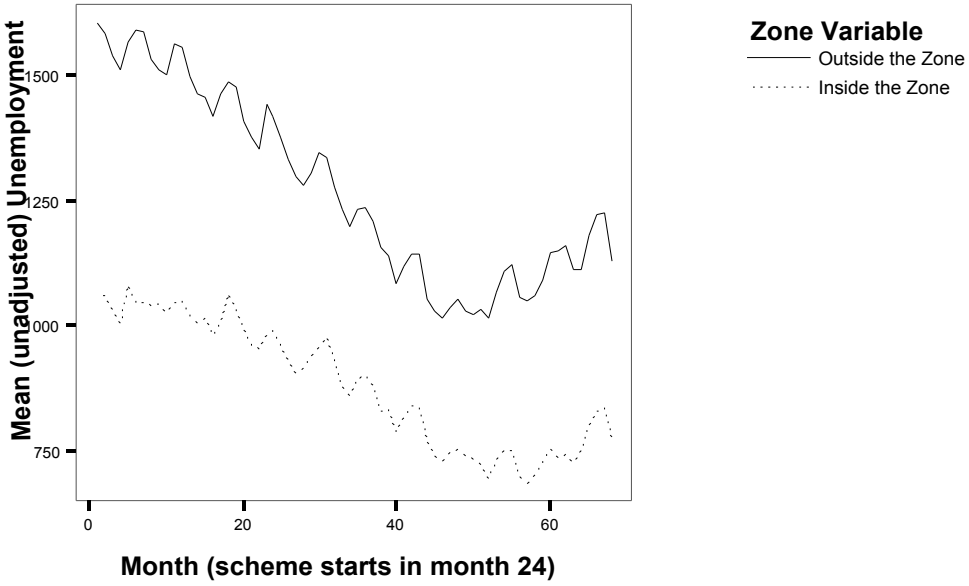


Figure 4 : Unemployment inside and outside the Designated Area (Table 5 Data)

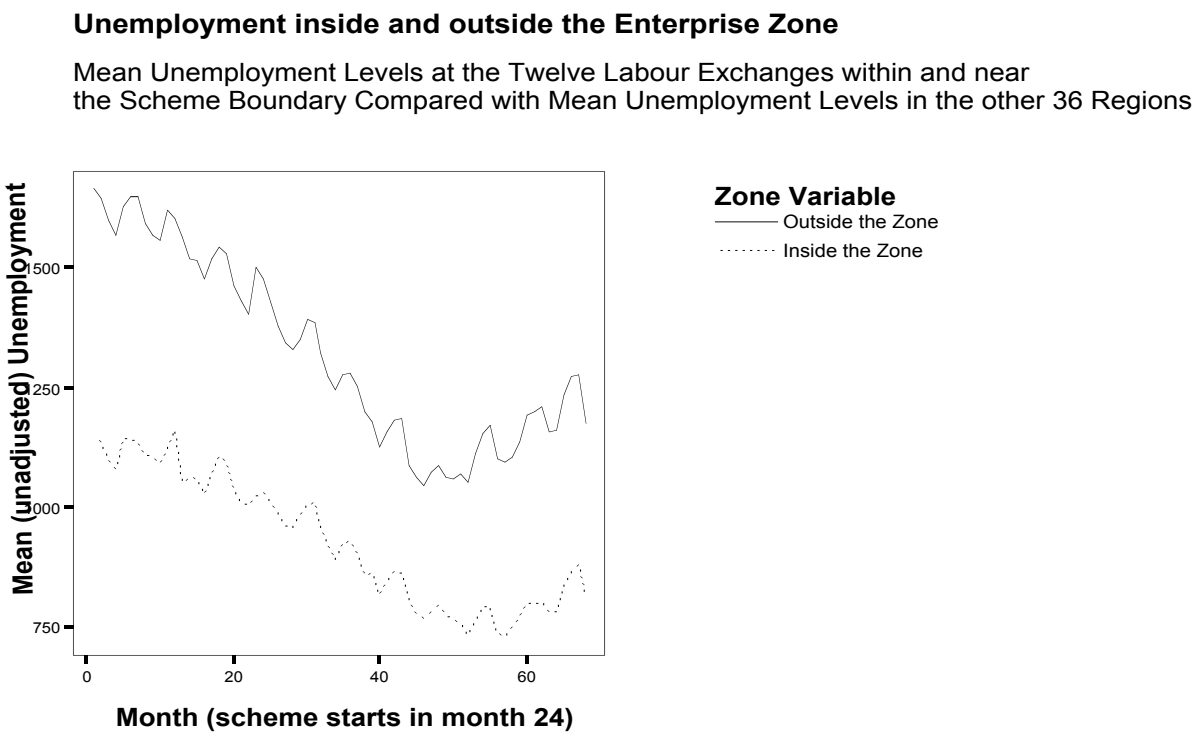


Figure 5: Unemployment inside and outside the Designated Area (Table 6 Data)

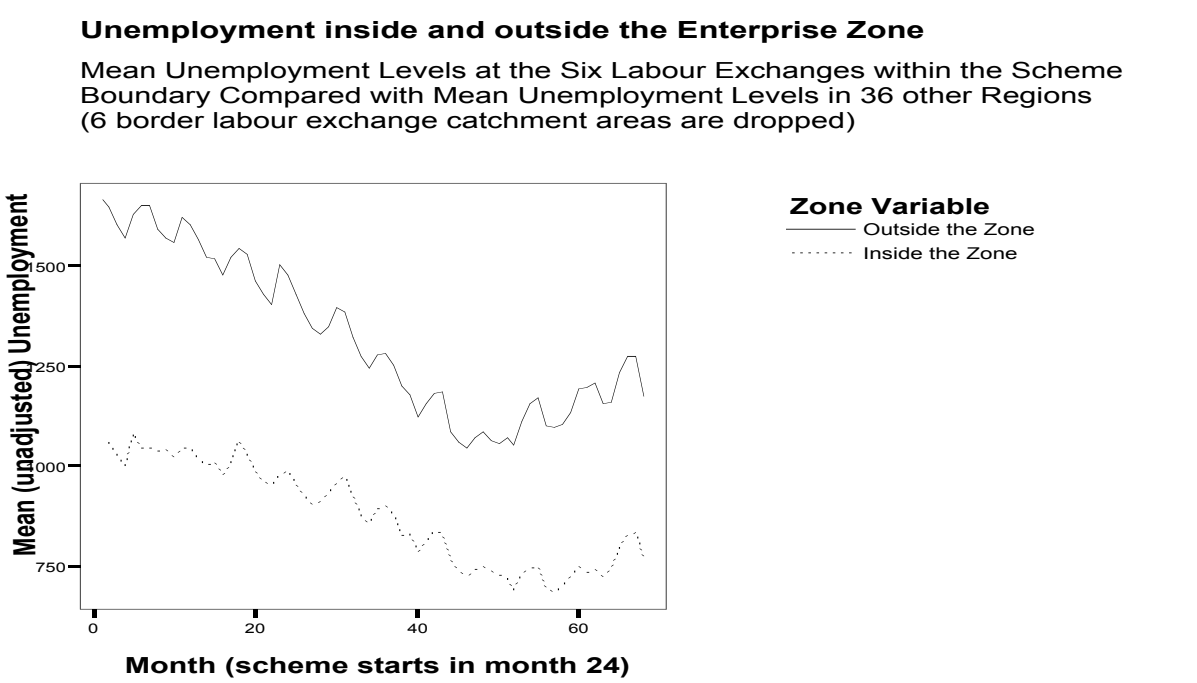


Chart 1: Estimated Monthly Reduction in the Live Register due to Scheme at the 6 'Test' Employment Offices (OLS Regression; Table 1)

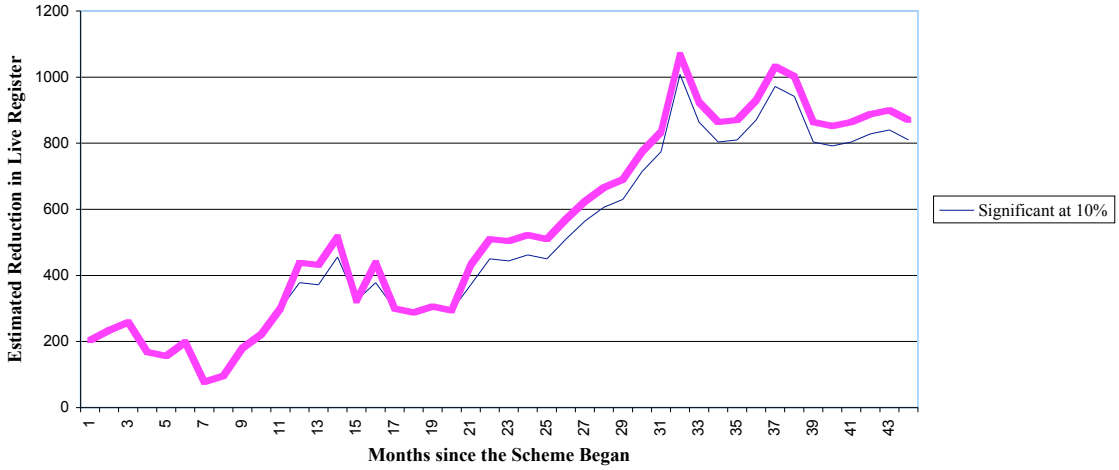


Chart 2: Estimated Monthly Reduction in Live Register due to Scheme in the 6 Test Offices (Group Level Heteroskedastic Regression; FGLS(1) Results Table 1)

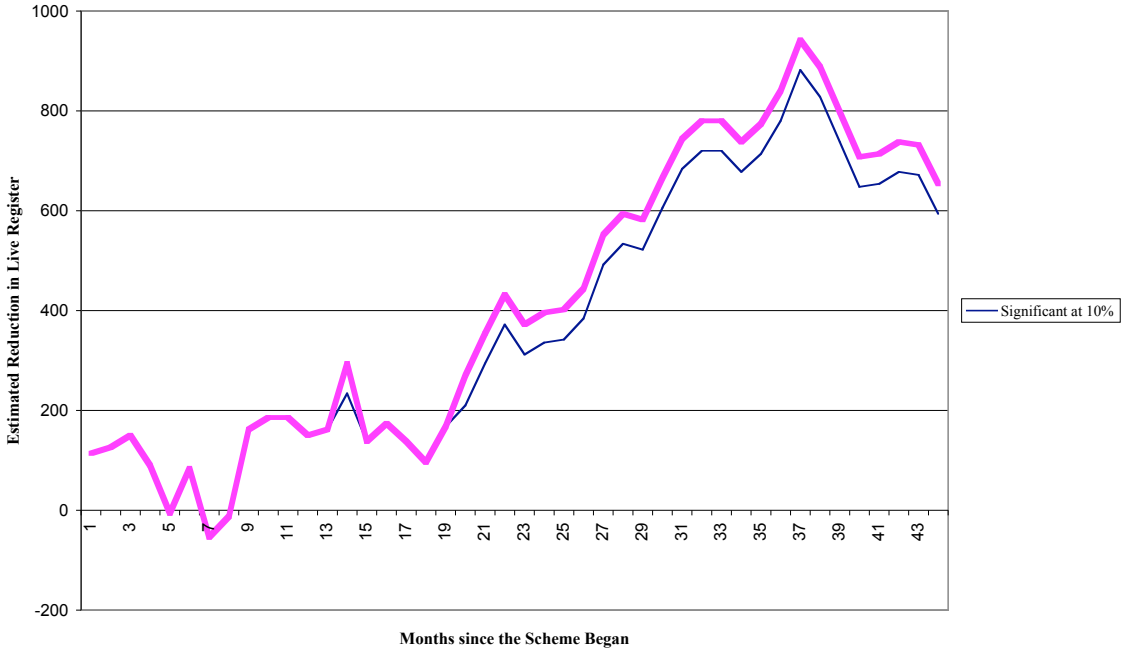


Chart 3: Estimated Monthly Reduction in Live Register due to Scheme in the 6 Test Offices (Heteroskedastistic Regression, Common AR1 Process; FGLS(2) Results from Table 1)

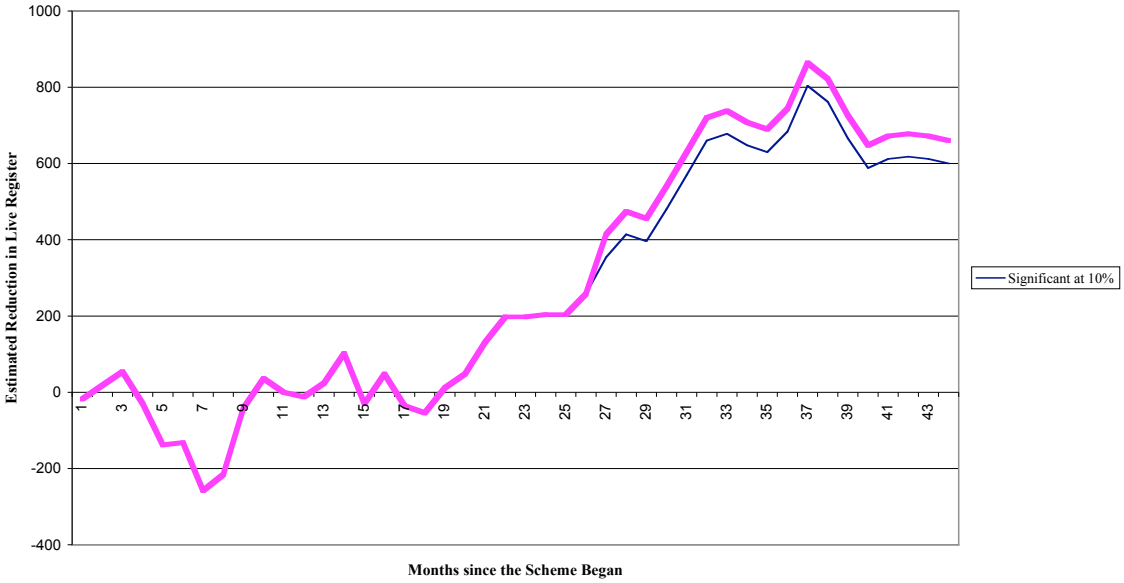


Chart 4: Estimated Monthly Reduction in Live Register due to Scheme in the 6 Test Offices (Heteroskedastistic Office Specific AR1 Procedure; FGLS(3) Results from Table 1)

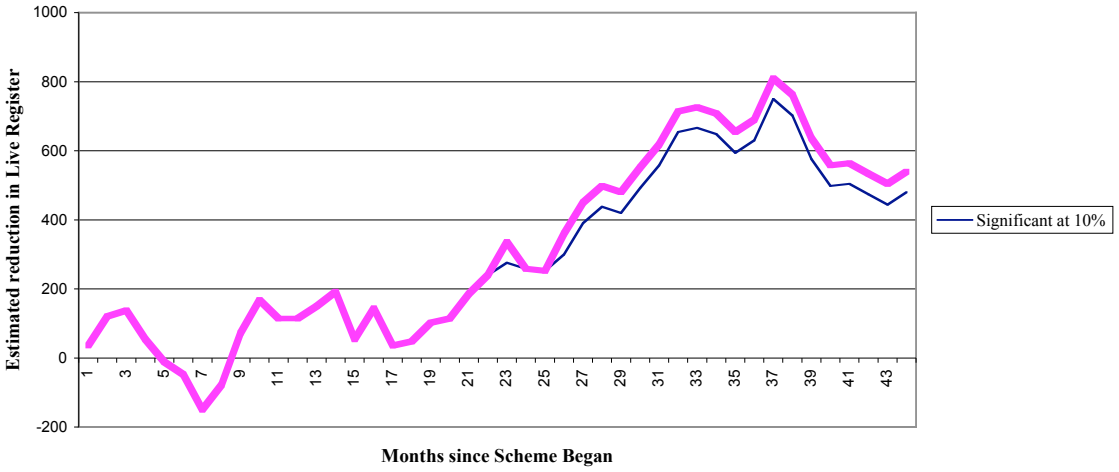


Chart 5: Estimated Monthly Reduction in the Live Register due to Scheme in the 6 Test Offices, (Heteroskedastistic Office Specific AR1 Procedure; FGLS(3) Results from Table 2)

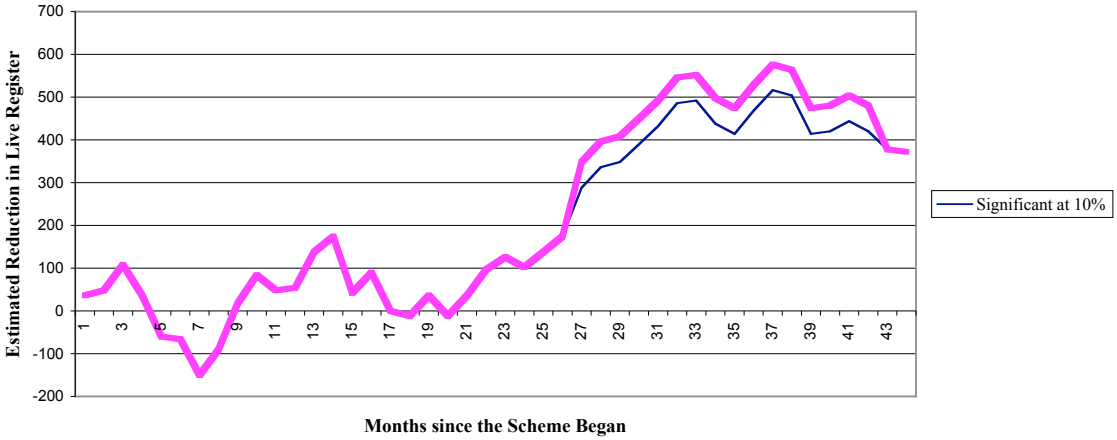


Chart 6: Estimated Reduction in Live Register due to Scheme in the 6 Test Offices (Heteroskedastistic Office Specific AR1 Procedure; FGLS(3) Results from Table 3)

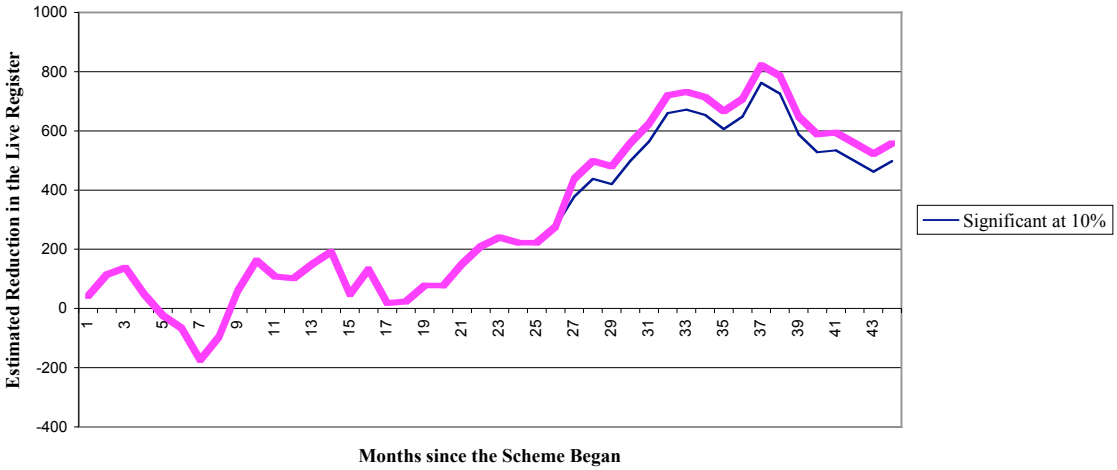
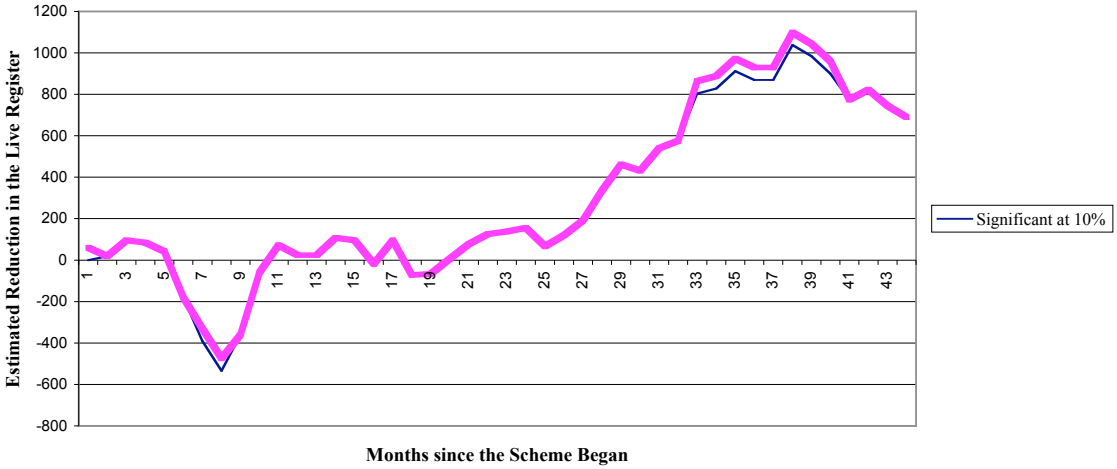


Chart 7: Estimated Reduction in the Live Register due to Scheme in the 6 Test Offices (Heteroskedastistic Office Specific AR1 Procedure; FGLS(3) Results from Table 4)



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